

THE DIALECTIC OF ORGANIC/INORGANIC RELATIONS

Marx and the Hegelian Philosophy of Nature

JOHN BELLAMY FOSTER

University of Oregon

PAUL BURKETT

Indiana State University, Terre Haute

Ecological thinkers have suggested that in applying an "organic/inorganic" distinction to humanity-nature, Marx embraced a dualistic and antagonistic conception of the human-nature relationship. The authors confront this view by considering how Marx's various applications of the concepts organic and inorganic were shaped not only by standard scientific usage but also by Marx's engagement with Hegel's natural philosophy and the historical struggle between materialism and teleology. They find that Marx's usage was based on an explicit disavowal of all mechanistic and dualistic views of the human-nature relationship. In Marx's mature works, all fixed oppositions between organic and inorganic gave way to a fully dialectical understanding of ecological processes. Marx's growing concern with the "metabolic rift" between humanity and nature generated by capitalist production led him to link the question of communism with that of ecological sustainability. Their analysis thus sheds light on the opposition between idealist and materialist visions of ecology.

Cartesian dualism gave to Western thought an enduring split between science and philosophy, between the physical-mechanical realm of science, on one hand, and the metaphysical realm of pure reason on the other. Ecological analysis, like most other modes of thought, still in many ways reflects this split today. Thus, it can be seen as being divided into (a) a *science of ecology*, which deals primarily with the relationship between organisms and their environments (including other organisms as well as "inorganic nature"), and (b) a *philosophy or metaphysics of ecology*, which attempts to draw on the notions of interdependence and holism and to apply them to all of existence, while also attributing to them an ethical content (Brennan, 1988; Hughes, 2000). The philosophical approaches to ecology most commonly propounded today, such as deep ecology, naturally claim to be inspired by recent developments in science that point to the need for greater holism. But by the same token, philosophical ecologists often see the mainstream of Western science, with its mechanistic, reductionistic, and deterministic orientation, as the ultimate source of the ecological problem. For many ecological scientists, in contrast, the leading philosophical approaches to ecology appear to be metaphysical and spiritualistic in nature, having little to do with ecological science as such.

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Various philosophical attempts have been made over the centuries to heal the deep division that originated with Cartesian dualism. The most ambitious attempts to bridge or transcend the gap arose within classical German philosophy. Kant responded to 17th-century Continental metaphysics and 17th- and 18th-century British empiricism and skepticism by creating a more transcendent dualism, which was seen as a necessary condition of critical reasoning itself. Hegel sought to overcome the divide within thought through a dialectical method that privileged an idealist ontology. Marx offered a dialectical method that privileged a materialist ontology and praxis.

In evaluating Marx's contribution to ecological thought, a tendency has emerged within metaphysical ecology to see him as a thinker who embraced certain aspects of a holistic, organic perspective, while ultimately giving in to a mechanistic and deterministic understanding of human-natural relations. Thus, Fritjof Capra (1982) refers in *The Turning Point* to an "ecological Marx," pointing out that Marx had "profound insights into the interrelatedness of all phenomena" (pp. 208-209), but goes on to contend that Marx ultimately succumbed to the deterministic perspective characteristic of mechanistic science.

Indeed, Marx (1974) is frequently criticized for having sinned against ecology as early as 1844 in his *Economic and Philosophical Manuscripts* by referring to nature as "man's inorganic body." This is often interpreted as evidence of a mechanistic view that set human beings against the rest of nature and that justified the domination of nature. The fact that Marx was developing a dialectical view which, although inspired by Hegel, took into account the alienation of nature from a materialist perspective and thus linked up with developments within 19th-century science (while explicitly rejecting mechanistic materialism) is simply missed in these criticisms.

A close study of the development of Marx's thought in this area will therefore serve to highlight the dualistic mode of thinking that characterizes much of contemporary ecology. At the same time, it will demonstrate the power of Marx's own ecological method and how it might serve as a guiding thread for a more revolutionary ecological praxis.

THE CRITIQUE OF "MARX'S INORGANIC BODY"

The term *organic* more than any other serves to denote the aspirations of philosophical ecology. Within contemporary Green theory, organic is often seen as a virtuous notion that reflects the essence of a deep ecological perspective. Organic connotes naturalness, connectedness, respect for living processes, a noninstrumental approach to nature, and so forth. In contrast, *inorganic* suggests something that is nonliving, unconnected, and maybe even unnatural. The whole notion of "organic farming"—that is, farming without pesticides and other harmful synthetic chemicals—further reinforces this conception of the organic as somehow representing the natural as opposed to the synthetic. This fits with the generally romantic, vitalistic, and spiritual character of much of today's Green theory, which seeks to impart a dualistic environmental ethics in which there is a sharp divergence between ecocentrism and anthropocentrism. Ecocentrism in this view is always on the side of the organic. Anthropocentrism, however, partakes of the inorganic; it relies instrumentally on dead nature (say, petroleum-driven machinery) to manipulate living nature and living species.

Such distinctions may strike one as crude, even meaningless. It is difficult, if not impossible, to maintain a hard and fast distinction between the organic and the inor-

ganic within ecological analysis, nor does one represent nature and the other not represent it. But given the overriding importance assumed by such distinctions in alternative ecological approaches today, the problem of the “organic” as somehow the object of ecological thought and practice is not so easily dismissed.

Out of this general outlook, which privileges the organic, has arisen one of the most ambitious criticisms of Marx’s ecological thought—one that raises issues that go back to the roots of ecological understandings within antiquity and that extend forward into the very heart of contemporary debates over ecology and the alienation of nature. Contemporary ecological critics commonly claim that in referring to man’s inorganic body, Marx created a dualistic conception of the human-nature relationship in which human beings and nature exist in perpetual antagonism. Marx, it is suggested, is a thinker who is anthropocentric in the extreme sense of insisting on human exceptionalism—that is, the notion that human beings are not really part of nature but are somehow above it, able to dominate it and escape its laws, which do not pose limits to humanity. At the same time, Marx is often criticized for being instrumentalist or “Promethean” in his view of nature, believing in the almost infinite capacity to manipulate nature for human ends through the development of technology—even siding with the machine and productivism against nature.

Thus, in an influential 1989 article titled “Marx’s Inorganic Body,” social ecologist John Clark argued that Marx’s *Economic and Philosophic Manuscripts of 1844* had employed a “dualistic view of humanity and nature and an instrumentalist view of the latter” (Clark, 1989, p. 251). These early manuscripts of Marx, in which he developed his conception of alienation (including the alienation of nature), have often been characterized as deeply ecological. For Clark, however, Marx’s embrace of the concept of nature as man’s inorganic body represented the beginnings of an antiecological perspective that was to pervade all his work.

In the *Economic and Philosophical Manuscripts*, Marx (1974) argued that

the universality of man manifests itself in practice in that universality which makes the whole of nature as his *inorganic* body, (1) as a direct means of life and (2) as the matter, the object and tool of his activity. Nature is man’s *inorganic body*, that is to say, nature in so far as it is not the human body. Man *lives* from nature, i.e. nature is his *body*, and he must maintain a continuing dialogue with it if he is not to die. To say that man’s physical and mental life is linked to nature simply means that nature is linked to itself, for man is a part of nature. (p. 328)

For Clark (1989), Marx’s statement here—despite its emphasis on the interdependent and continuous exchange between human beings and nature—offers definitive proof of the antiecological character of Marx’s thought, simply because nature (outside of the human body) is characterized as man’s *inorganic* body. As Clark himself puts it,

Marx distinguishes between nature as “organic body,” that is, as human body, and nature as “inorganic body,” that is, the rest of nature. While a mere distinction between two such realms within material nature is not, obviously, in itself an ontological false step, the valuation underlying the distinction is another question. The “inorganic” quality of “external” nature signifies its instrumental character in relation to an abstracted humanity, which is taken to be the source of all value. (p. 251)¹

Although Marx explicitly recognizes an estrangement (or alienation) between human beings and nature, Clark (1989) still asserts that the reference to “inorganic

nature” as “man’s” extended body is symptomatic of a kind of ecological imperialism. Hence, according to Clark,

Estrangement from nature [for Marx] is in no way taken to mean nonrecognition of intrinsic value throughout nature or of the interrelatedness between human values and the larger unfolding of value over the course of natural history; rather it means the failure of “man” to utilize nature self-consciously and collectively in productivity, that is, in “the objectification of man’s species life.” (p. 251)

Clark is fully aware that defenders of Marx, such as Donald Lee (1980) and Howard Parsons (1977), have emphasized the organic connection that Marx was trying to express through his reference to external nature as man’s inorganic body. Clark (1989) rebuts,

Presumably, we are to focus all our attention on the “organic” term *body*. Yet this still leaves us with the rather perplexing and embarrassing fact that the evidence for a reality being “organic” is that it is described as being “inorganic”! (p. 244)

Marx (1973) had written in the *Grundrisse*,

Nature builds no machines, no locomotives, railways, electric telegraphs, self-acting mules, etc. These are products of human industry; natural material transformed into organs of the human will over nature, or of human participation in nature. They are *organs of the human brain, created by the human hand*; the power of knowledge, objectified. (p. 706)

Clark (1989) refers to this statement, in which Marx builds on his notion of nature as the inorganic body of humanity, as exhibiting “at best. . . a highly distorted body consciousness.” It merely suggests, Clark claims, that “mechanized nature becomes more ‘organic’ to ‘man’ than the living whole of nature can ever be” (pp. 243, 254).

Other critics of Marx have followed suit. Robyn Eckersley (1992) refers to Marx’s treatment of nature as man’s inorganic body in order to promote the view that Marx relied heavily on the notion of an “antagonistic dialectic” inherent to the human-nature relationship:

In the so-called Paris Manuscripts (i.e., *The Economic and Philosophic Manuscripts of 1844*), Marx referred to the labor process as effecting the progressive “humanization” of nature and “naturalization” of humanity. Nature was described as “the inorganic body” of humanity that had been increasingly assimilated, through work, into an “organic” part of humanity. . . . Marx’s treatment of humans as *homo faber* is a central feature of the antagonistic dialectic between humanity and nature set out in these early writings. . . . Although more and more areas of nature would come under human control through technological development, the *antagonistic* dialectic between humanity and nature would never be entirely resolved. (Eckersley, 1992, pp. 78-79)

In Eckersley’s (1992) interpretation, Marx developed a one-sided concept of freedom in which nature is merely an instrument for the extension of the human body. Human society has as its goal “the further subjugation of the nonhuman world” as the route to human freedom (Eckersley, 1992, p. 90). Similarly, Kate Soper (1996, p. 91)² associates Marx’s notion of nature as inorganic body with the

“Promethean” goal of the human, mechanistic domination of nature that supposedly characterized his later thought.

Val Routley (1981), writing like Clark (1989) for *Environmental Ethics*, objects to the mere fact that Marx referred to extrahuman nature as “man’s body.” This is interpreted as an extreme Enlightenment humanism that transfers God’s traditionally conceived determining role in nature to humanity itself. The treatment of nature as the “body” of man can, in Routley’s (1981) words,

usefully be seen as the product of Marx’s well-known transposition of God’s features and role in the Hegelian system of thought onto man. . . . Thus Marx’s theory represents an extreme form of the placing of man in the role previously attributed to God, a transposition so characteristic of Enlightenment thought. (pp. 239-240)

In Routley’s view, Marx’s claim that nature is

man’s body seems to carry also the unattractive implication that nature is man’s *property*—one’s body is, after all, one’s own, and usually considered to be entirely at one’s disposal, subject to only very minor qualifications. The analogy thus reinforces damaging “human property” views of the natural world. (p. 243)

Ariel Salleh (1997) has argued that the extreme anthropocentric view that “plants and animals are supplied by evolution as a means of human subsistence” (pp. 71-74) can be found in Marx’s notion that nature is man’s inorganic body—and that this ontological embrace of human domination over nature goes hand-in-hand with an uncritical acceptance of the domination of men over women. Marx’s analysis is thus “riddled with ontological notions derived from the [medieval, scholastic] Great Chain of Being. This ancient theological rationale established a value structure based on God’s domination over Man, and men’s domination over women, the darker races, children, animals and wilderness” (Salleh, 1997, pp. 71-74).³

A somewhat different criticism of Marx’s organic/inorganic distinction was forwarded by John O’Neill (1994) in an article in *Radical Philosophy*. O’Neill claims that the treatment of nature as “our ‘inorganic body’” is the part of Marx’s thinking “most compatible with recent green thought” (p. 26). Nevertheless, he argues that it has to be rejected as untenable on both scientific and ethical grounds. O’Neill writes,

Nothing in the science of ecology entails that there is no significant division between an individual organism and its environment. Ecology studies the relationships between different populations that are made of just such individual organisms. It entails no radically holistic ontology. Hence it does not entail that “I and nature are one” or that the “the world is my body.” (p. 26)

However, in making this argument, O’Neill implicitly uses what scientists Richard Levins and Richard Lewontin (1985) have called a “reductionist” approach according to which ecology must emphasize either holism or differentiation, as opposed to a more “dialectical” approach that encompasses both (by treating nature as a complex *unity-in-difference*). Along similar lines, O’Neill (1994) suggests that it is “ethically untenable” to describe nature as the “inorganic body” of humanity because to do so is to treat “distinct natures” as mere “extensions” (p. 26) of human beings, thereby downgrading their distinct intrinsic values. Here again, O’Neill’s

argument presumes that Marx's approach was not a dialectical one but a purely instrumentalist-anthropocentric view running counter to any ecological ethics. Such are the grounds on which O'Neill suggests that "Marx's view of nature as our 'inorganic body,' together with those 'holistic' components of recent green thought to which it is similar, should be rejected" (p. 26).

So pervasive have been environmentalist criticisms of Marx for employing the concept of nature as inorganic body that even a strong defender of Marx such as Donald Lee (1980), whose ecohumanist Marxist essay for *Environmental Ethics* helped set off the debate in this area, chided Marx for this formulation. Although noting Marx's recognition that humanity is "intrinsically tied to nature," Lee laments over "Marx's homocentrism . . . so pronounced here when he speaks of the nonhuman animal and vegetable kingdom as man's 'inorganic' body" (pp. 14-15).

Yet, the problem with all such criticisms of Marx's "organic/inorganic" outlook lies in their refusal to engage fully with the complex issues that it raises. For Clark (1989), as we shall see, a body of thought can only be considered ecological to the extent that it is "teleological" and thus distances itself from a consistent materialism—and a similar one-sidedness afflicts the other ecological critics. By contrast, Marx treats the human relation to nature as both materialist and dialectical, so that the crucial question becomes the nature of the interaction that takes place (in Marx's later vocabulary, the "metabolic" relation between society and nature). The question of nature as man's inorganic body is not to be dismissed as a mere instrumentalist, anthropocentric view. To do so is to succumb to a static foundationalist approach to environmental ethics, divorced from history and evolution. Furthermore, the organic/inorganic question should not be rejected on grounds that it contradicts a scientific perspective on ecology, as O'Neill (1994) claims. Rather, the issue is the coevolution of human society and nature—that is, the very possibility of an ecological understanding of human history.

THE ORGANIC/INORGANIC DISTINCTION AND HEGEL'S PHILOSOPHY OF NATURE

It is somewhat odd, given the foregoing charges with regard to Marx's concept of inorganic nature, that none of the critics have made any inquiry into the history of the concepts of organic and inorganic, their relation to Hegel's texts, or even the systematic way in which the organic/inorganic distinction is variously applied in Marx's writings themselves. Yet, to proceed in this way, examining the history and use of this conceptual distinction is to sharpen our understanding of the origins of ecological knowledge and of Marx's own contributions.

In ancient Greek usage, the word *organ* (*organon*) also meant tool, and organs were initially viewed as "grown-on tools" of animals—whereas tools were regarded as the artificial organs of human beings (*Oxford English Dictionary* [OED], 1971, p. 2007; Pannekoek, 1912, p. 50). Characteristic of the natural-dialectical worldview of the ancient Greeks was the recognition of a close relationship between tools as extensions of human beings and the organs of animals, because they were both part of the general process of species adaptation to natural conditions. Indeed, the connection between what Marx in *Capital* was to call "natural technology" (that is, physical organs) and "artificial technology" (the tools created by human beings) was to play a part in the earliest accounts of evolutionary adaptation in the writings of the ancient Greek materialists: Empedocles, Democritus, Epicurus, and Lucretius. Marx, who wrote his doctoral thesis on Epicurus, was well aware of these ancient contributions to evolutionary thinking (see Foster, 2000).⁴

Indeed, Marx and Engels extended this line of argument, developing it into a full-fledged theory of human evolution following Darwin's great contribution (see the next section).

By early modern times, as Carolyn Merchant (1980) notes in *The Death of Nature*, "the term *organic* usually referred to bodily organs, structures, and organization of living beings" (pp. xix-xx). Within physiology in the 19th century, *organic* meant having to do with bodily organs or an organized physical structure, especially with regard to plants and animals. In his *Philosophy of Health*, T.S. Smith (1835) wrote that "the organic actions consist of the processes by which the existence of the living being is maintained" (as cited in OED, 1971, p. 2008). By the same token, the word *organically* was usually used to refer to "bodily organs or their functions; in the manner of an organized or living being" (OED, 1971, p. 2008).

This use of the term *organic* naturally had its counterpart in the use of *inorganic*. According to the OED (1971), the principal meaning of inorganic in the 17th, 18th, and 19th centuries was that of being "not characterized by having organs or members fitted for special functions; not formed with the organs or instruments of life" (p. 1443). In his *Essay Concerning Human Understanding*, Locke (1690/1959) had referred to "the lowest and most inorganic parts of matter" as lying at the bottom of the great chain of being (Vol. 2, p. 68). Similarly, *inorganically*, in the early modern period and up through the 19th century, generally meant "without organs" (OED, 1971, p. 1443).

Where Marx was concerned, the use of the terms *organic* and *inorganic* did not derive simply from ancient philosophy and from contemporary scientific usage but rather was directly affected by his confrontation with Hegel's (1830/1970) *Philosophy of Nature*. Marx had taken notes on the section of Hegel's (1959) *Encyclopedia* dealing with the philosophy of nature in 1839, while working on his doctoral thesis. The philosophy of nature is the most problematic point in the Hegelian system because here the Idea is most alienated from itself. Indeed, nature is viewed as the alienation of the Idea, which imposes its own conscious structure on nature (in conformity with nature's mechanics) and thus returns to itself. Hegel (1830/1970) thus sought to demonstrate that nature is in its essence "self-alienated Spirit" (Vol. 1, p. 206). Needless to say, it is here that the conflict with materialism is most severe. As Auguste Cornu (1957) observed, although

it might be relatively easy to establish a radical concatenation and dialectical order among concepts; it is already harder to do so in history, where the contingent and the accidental play a greater part; and by the time we come to the realm of nature, the assimilation of the real to the rational can be carried out only by extremely arbitrary procedures. (pp. 37-44)

Nevertheless, although rejecting Hegel's philosophy of nature, Marx drew critically on its more dialectical insights. This was particularly the case where Hegel's central dialectic of the organic and inorganic was concerned. The attempt to develop an understanding of the organic unfolding out of the inorganic pervades Hegel's entire philosophy of nature. It is in its "Organics," as Marx perceived, that one finds in Hegel's philosophy of nature "the determination of subjectivity, in which the real distinctions of form are. . . brought back to ideal unity, which is self-found and for itself" (Marx & Engels, 1975, Vol. 1, p. 510). It is thus in the realm of organics that the estrangement of the spirit, which has gone over into the exteriority of nature, is overcome as it returns into its own higher unity (of con-

sciousness). The organism (particularly the animal organism), in other words, comes to stand for subjectivity and self-dependence—that is, for rational life connected to the life of the spirit within nature. Here, animate species are the means by which the spirit discovers itself in nature and overcomes its estrangement.

Hegel argues that the organic is connected to the inorganic in three ways. First, the organic and the inorganic are one (unity) because each organism has its inorganic within itself as a part of itself. Second, the organic and inorganic are in opposition (difference) because the organic lives only by feeding off of the inorganic as its condition of existence. Third, the organic and inorganic are combined as a unity-in-difference (the divisions between them dynamically transformed and to some extent resolved) in reproduction, development, and death (see Taylor, 1975, p. 359). “In its inner formation,” Hegel (1830/1970) writes, “the animal is an unmediated self-production, but in its outwardly oriented articulation, it is a production mediated by its inorganic nature” (Vol. 3, p. 185). Nature in its subjectively determinate form exists, for Hegel, only when it

individualizes inorganic things, or relates itself to those already individualized, and assimilates them by consuming them and destroying their characteristic qualities, i.e. through *air* entering into the process of respiration and of the skin, *water* into the process of thirst, and the particular formations of individualized *earth* into the process of hunger. Life, which is the subject of these moments of the totality, constitutes a state of tension between itself as Notion and the external reality of these moments, and maintains the perpetual conflict in which it [consciously] overcomes this externality. (Hegel, 1830/1970, Vol. 3, pp. 147-148; see also Hegel, 1807/1977, pp. 154-80)

It is in this sense, Hegel (1830/1970) suggests, that “organic being, which is an individuality existing for itself and developing itself into its differences within itself, constitutes totality as found in nature” (Vol. 1, p. 219)—a totality that forms the basis for the spirit’s transcendence of nature’s exteriority.

As Hegel (1830/1975) explained in his smaller *Logic*, part of the *Encyclopedia of the Philosophical Sciences*, the living thing has as its “presupposition . . . an inorganic nature confronting it. As this negative of the animate is no less a function in the notion of the animate itself, it exists consequently in the latter . . . in the shape of a defect or want” (p. 281). Hence, the “self-assured living thing” maintains and develops and objectifies itself only “against an inorganic nature,” which it “assimilates to itself” (p. 281). This inorganic nature is subdued and “suffers this fate, because it is *virtually* the same as what life is *actually*. Thus in the other the living being only coalesces with itself” (Hegel, 1830/1975, p. 281).

Hegel’s understanding of organic/inorganic relations is set out most concretely in his treatments of plant and animal existence. The unity of the “vegetative” realm (captured in Goethe’s [1952] *Metamorphosis of Plants*) is, according to Hegel, evident in “the processes of its quantitative growth,” whereas “its qualitative metabolism of elements are at the same time the processes of its decay; cells, fibers, and the like multiply until they smother the plant in dead wood” (Hegel, 1959, p. 183). Furthermore,

the plant is interwoven with its environment, whereas the animal breaks this immediate context. It is alive for itself. The animal soul is the inner unity of the whole animal, wholly present in all of its functions. Corresponding to this concentration in itself, the environment becomes for the animal an outer world to which it

has to adapt itself. Whereas in the plants the elementary life of nature in earth, water, air, and light is directly absorbed; the animal, on the contrary, transforms the elementary life of organic and inorganic nature into stimuli to which it responds in many ingenious ways. (Hegel, 1959, pp. 185-86)

What Marx took from Hegel (and also from Feuerbach) in this regard was the dialectical perception that human beings, as objective, organic creatures, are also dependent on inorganic nature as part of their own species being. Marx wrote,

Hunger is a natural need; it therefore requires a nature and an object outside itself in order to satisfy and still itself. . . . The sun is an object for the plant, an indispensable object which confirms its life, just as the plant is an object for the sun, an expression of its life-awakening power and its objective essential power. A being which does not have its nature outside itself is not a natural being and plays no part in the system of nature. (pp. 389-390)

For Marx, human beings are active, living, transformative creatures in charge of their own bodies and drives; at the same time, they are “natural, corporeal, sensuous, objective” beings who suffer, whose natural objects, the conditions of their existence, the inorganic body of nature by which they seek to extend themselves, are to be found outside of themselves (Marx, 1974, pp. 389-390). In general, “species-life, both for man and for animals,” Marx argues, “consists physically in the fact that man, like animals, lives from inorganic nature; and because man is more universal than animals, so too is the area of inorganic nature from which he lives more universal”—both physically and spiritually (pp. 327-328). The relation between the organic body of a human being and the inorganic world is one that is conditioned by the subsistence needs of human beings and their capacity through social labor to transform the “external” conditions of nature into means of satisfying these needs. Rather than postulating a sharp ontological break between human beings and nature (a break that, as we shall see, only arises through the alienation of nature), Marx thus attempted to describe the material interconnections and dialectical interchanges associated with the fact that human species-being, similar to species-being in general, finds its objective, natural basis outside of itself, in the conditioned, objective nature of its existence.

In Marx’s dialectical understanding, in which he was heavily influenced by Hegel, all of reality consists of relations, and any given entity is the summation of the relations of which it is a part (see Ollman, 1976). In this sense, the organic body of humanity (like all species) includes within itself the inorganic conditions of its existence, which may at first appear (in a society characterized by the alienation of human beings and of nature) as mere “external” things—opposing forces. It is this complex dialectical conception then that informs Marx’s ecological thought. However, in Marx (by contrast with Hegel), the organic/inorganic dialectic always was influenced by the “immanent dialectics” of materialism, going back as far as the ancient Greeks (particularly Epicurus). Hence, Marx’s dialectical conception of nature never took the idealist form it assumed in Hegel in which the object of analysis was simply the estrangement of spirit, going out into nature and returning to itself; Marx was also not driven, as was Hegel, to the denial of evolution and a rigid separation of human beings from the rest of nature. For Hegel, as Marx (1974) observed, nature is “defective” insofar as it represents “externality” or “antithesis to thought” (p. 400). But for Marx himself, it was necessary to explain how human history and natural history were interconnected within sensuous existence (Marx, 1974).

MARX'S DIALECTIC OF ORGANIC/INORGANIC: THE CONDITIONS OF HUMAN EXISTENCE

In developing his overall analysis of capitalism and communism, Marx employed the organic/inorganic distinction in three different but related senses, which can be designated as (a) *scientific*, (b) *dialectical*, and (c) *materialist*. First, he referred to nature (other than the human body) as the inorganic body of humanity in conformity with the scientific vocabulary of his day, wherein organic referred to bodily organs, whereas inorganic meant unrelated to bodily organs. From the *Economic and Philosophical Manuscripts* and on for the rest of his life, Marx (1974) at various points treats nature, insofar as it enters directly into human history through production, as an extension of the human body (that is, the inorganic body of humanity). Of course, this bodily relation to nature is mediated not only through human-social labor but also by means of the tools—themselves products of the human transformation of nature through production—that allow humanity to appropriate and use nature in ever more universal ways (more will follow on this point). But the present, more basic point is that the human-nature relationship physically transcends, at the same time that it practically extends, the actual bodily organs of human beings—hence, the reference to nature as man's inorganic body. Here, inorganic simply means external to, yet in constant interchange with, the human body itself, in a basic material and biological sense. As Marx (1974) indicates, to say that humanity "lives from nature" is to say that nature is "man's *inorganic body*" and that "nature is linked to itself, for man is a part of nature" (p. 328).

That nature is both external to and the material and biological substance of the human condition leads directly to a second way in which Marx employs the organic/inorganic distinction. This can be characterized as dialectical, emanating in particular from Hegel's (1970) *Philosophy of Nature*. Here, inorganic is used to refer to the inherent "exteriority" or "objectivity" of nature as a condition of human subjective activity (labor) and the fulfillment of human bodily needs; hence, it appears as a condition of the development of humanity as a distinct species. Thus, in the *Grundrisse*, Marx (1973) refers to "the *natural* conditions of labour and of reproduction" as "the objective, nature-given inorganic body" of human subjectivity (p. 473). Further along in the same text, Marx explains that the "first objective condition" of labor appears to the worker "as nature, earth, as his inorganic body; he himself is not only the organic body, but also the subject of this inorganic nature," which represents an objective force external to the worker (pp. 488-490). As society develops, the human producers in a given historical social formation come to identify "a specific nature (say, here, still earth, land, soil)" as their own "inorganic being, as a condition" of their own "production and reproduction" (Marx, 1973, pp. 488-490). Like Hegel, as we have seen, Marx argued that a being that does not have its object outside of itself, in the objective, inorganic conditions of its existence, is not a natural, organic being.⁵

It is interesting to note that Marx's holistic perspective on the human-nature dialectic at times led him to reverse the ordering of organic/inorganic by applying the former term to extrahuman nature. These terminological reversals normally occurred when Marx was considering natural conditions as necessary and, at least partly, uncontrollable conditions of human production. When analyzing materials price fluctuations in Volume 3 of *Capital*, for example, Marx (1981) refers to raw materials derived from "organic nature," whose production is in large part determined by "uncontrollable natural conditions, the seasons of the year, etc." (p. 213). Such "raw materials supplied by organic nature" include "plant and animal products,

whose growth and production are subject to certain organic laws involving naturally determined periods of time” (Marx, 1981, pp. 213, 216). These naturecentric applications of the organic term have their counterpart in Marx’s (1981) reference (in *Capital*’s discussion of ground rent) to the terrestrial body, comprising “the earth’s surface, the bowels of the earth, [and] the air” as the basis for “the maintenance and development of life” (p. 909). The *Grundrisse* similarly refers to “the earth” as “the source of all production and of all being . . . the seat, the *base* of the community” (Marx, 1973, p. 106) and describes “the soil itself” as “the direct well-spring of subsistence” (p. 276). Here, human beings are basically treated as (conscious, socially developed) extensions of nature’s body (cf. Schmidt, 1971, pp. 16, 42-43; Smith, 1984, pp. 18-19). In short, Marx’s dialectical usage of the organic/inorganic distinction and his general analysis of natural conditions as conditions of human production and human life hardly involve the kind of one-sided, anti-ecological anthropocentrism claimed by his critics (see Burkett, 1999, chaps. 2-4).

This brings us to the third sense in which Marx employs the organic/inorganic distinction. Ultimately, Marx’s references to nature, external to the human body, as both the inorganic body of humanity and the precondition of human-social existence, are meant to get at the materialist foundation of human species-being. For Marx, the human-nature relation develops through tool making (technology)—that is, the appropriation and use of inorganic nature to extend the organs of the human body in the production of the means of subsistence. As Marx (1976) put it in *Capital*,

Leaving out of consideration such ready-made means of subsistence as fruits, in gathering which a man’s bodily organs alone serve as the instruments of his labour, the object the worker directly takes possession of [within the labor process] is not the object of labour but its instrument. Thus nature becomes one of the organs of his activity, which he annexes to his own bodily organs, adding stature to himself in spite of the Bible. (p. 285)⁶

The role of human-manufactured tools, analogous to the productive functions of human bodily organs—with mediating between both human beings and nature—is further highlighted elsewhere in *Capital* when Marx (1976) states, “Just as a man requires lungs to breathe with, so he requires something that is the work of human hands in order to consume the forces of nature productively” (p. 508). The point is developed even more clearly in the 1861-1863 draft of *Capital* in which Marx characterizes the labor process as a “process of appropriation” of nature “as of the animated body, the organs of labour itself. Here the material appears as the inorganic nature of labour, and the means of labour as the organ of the appropriating activity” (Marx & Engels, 1975, Vol. 30, p. 58). We have already referred at the beginning of this essay to Marx’s (1973) well-known statement in the *Grundrisse* in which he describes “machines . . . locomotives, railways, electric telegraphs, self-acting mules, etc.” as “*organs of the human brain, created by the human hand*; the power of knowledge, objectified” (p. 706). Despite Clark’s (1989) previously cited claim that this constitutes a highly distorted body consciousness, Marx’s point can now be seen as an essentially dialectical and materialist one, specifying the conditions underlying the labor process that alone allows human beings to exist and to develop in relation to nature.

For Marx, this analysis of tools as “organs” was central to a materialist account of human evolution. Accordingly, in *Capital*, Marx (1976) used Darwin’s (1968) comparison of the development of specialized organs in plants and animals to that

of tools (in chapter 5, p. 187 of *The Origins of Species*, on “Laws of Variation”) to draw a distinction between natural technology and human technology (Marx, 1976, pp. 461, 493-494). Here, both Darwin (1968) and Marx (1976) were undoubtedly influenced by the original Greek notion of organ (*organon*), which also meant tool, making the organs of animals grown-on (adnated) tools. For Marx, this approach offered clues to the development of human technology and the labor process. Whereas animals had for the most part evolved through the intergenerational development of their organic bodies directly, in the case of human beings, the capacity to make tools and thus to extend their bodies into inorganic nature had been of greater historical importance. This specifically human characteristic had allowed for more universal forms of development, which were obviously related to the social process of tool making and the gradual development of the brain, language, and so forth (Foster, 2000, pp. 200-202).

Engels was to expand this argument further in his important posthumously published essay, “The Part Played by Labour in the Transition From the Ape to Man” (1896). According to Engels’s (1940) analysis—which derived from his materialist philosophy but was also influenced by views introduced by Ernst Haeckel a few years before—when the primates who were to be the ancestors of human beings descended from the trees, erect posture developed first, prior to the evolution of the human brain, freeing the hands for tool making.

The hand became free and could henceforth attain ever greater dexterity and skill, and the greater flexibility thus acquired was inherited and increased from generation to generation. Thus the hand is not only the organ of labour, it is also the product of labour. Only by labour, by adaptation to ever new operations, by inheritance of the resulting special development of muscles, ligaments, and, over longer periods of time, bones as well, and by the ever renewed employment of these inherited improvements in new, more and more complicated operations, has the human hand attained the high degree of perfection that has enabled it to conjure into being the pictures of a Raphael, the statues of Thorwaldsen, the music of Paganini. (Engels, 1940, p. 281)

As a result, early humans (hominids) were able to transform their relation to their local environment, radically improving their evolutionary adaptability. Those who were most ingenious in making and using tools were most likely to survive, which meant that the evolutionary process exerted selective pressure toward the enlargement of the brain and the development of speech (necessary for the social process of labor), leading eventually to the rise of modern humans. Hence, the human brain, in Engels’ (1940) view, evolved through a complex, interactive set of relations now referred to by evolutionary biologists as *gene-culture coevolution*. All scientific accounts of the evolution of the human brain, Stephen Jay Gould (1987) has explained, have been theories of gene-culture coevolution, and “the best nineteenth century case for gene-culture coevolution was made by Friedrich Engels” (pp. 111-112).

The contrast between this materialist explanation of human evolution and ancient teleological accounts could not be sharper. “Man alone of all the animals,” Aristotle had written,

is erect, because his nature and his substance are divine. To think, to exercise intelligence, is the characteristic of that which is most divine. . . . Now Anaxagoras has said that it is the possession of hands that has made man the most intelligent of animals. The probability is that it was because he was the most intelligent that he got

hands. For hands are a tool, and nature, like an intelligent man, always distributes tools to those that can use them. The proper thing is to give a genuine flute-player a flute rather than to give a man who happens to have a flute the skill to play; for that is to add the lesser to the greater and more august instead of adding the greater and more precious to the lesser. If, then, it is best that it should be so, and if nature, out of what is possible, always does the best, it is not because he has hands that man is wise, but because he is the wisest of the animals he has hands. (as cited in Farrington, 1944, pp. 128-129)

Such was the prejudice—what Engels (1940) referred to as the idealist emphasis on the seat of cognition in the understanding of human evolution—that the significance of the freeing of the hands for tool making (hence, labor) was downplayed in 19th- and early 20th-century science, and the belief of most evolutionary scientists continued to be that the brain had led the way in the evolution of the human species so that our earliest ancestors would distinguish themselves first and foremost by their cerebral development. The expectation was that the “missing links” between primates and human beings, when they were discovered, would exhibit a brain at an intermediate level of development. These expectations collapsed with the discovery, beginning in the 1920s and more fully in the 1970s, of the genus *Australopithecus*, dating back as many as 4 million years ago. The brain of *Australopithecus* was enlarged only very slightly, and was generally of ape-like proportion in relation to the body. Nevertheless, the australopithecines were clearly hominid species, standing erect, exhibiting evolved hands (and feet), and already making tools. As a result of these discoveries, much of modern anthropological theory has come around to the materialist-coevolutionary view pioneered by Engels in the 19th century, summed up by the phrase “Tools Make the Man” (Washburn & Moore, 1974, p. 186). It is labor—and the specific social relations in and through which it takes place—that constitutes the secret, from the very first, not only to the development of human society but also to “the transition of ape to man.” It is socially developed labor, moreover, that defines the distinctive ecological niche occupied by humanity. Marx and Engels thus see the human-social relation to the earth in coevolutionary terms—a perspective that is crucial to an ecological understanding because it allows us to recognize that human beings transform their environment not entirely in accordance with their choosing, but based on conditions provided by natural history (of which human-social history is a part).

If Marx and Engels emphasize tool making as an evolutionary extension of human bodily organs, by which human society uses elements of inorganic nature, their understanding of this material-social relationship did not simply start or stop there. Equally important, because of its wider significance, was the whole human relation to the land, especially through agriculture and the connections between agriculture and other industries. “Only cultivation of the soil,” Marx (1973) wrote in the *Grundrisse*, “posits the land as the individual’s extended body” (p. 493). The existence of nature as a material precondition of human development is immediately apparent, according to Marx, in the case of the fertility of the soil. Agricultural production, the most basic form of production (because the physical subsistence of the laborers always depends on it), “rests on qualities of its inorganic nature,” that is, the chemistry of the soil and its nutrients (Marx & Engels, 1975, Vol. 34, p. 155). It is the separation of human beings from the soil (and hence from the organic products of the soil) and their agglomeration into huge cities that constitutes, for Marx, the *differentia specifica* of capitalism (Marx, 1976, pp. 769, 929). This severing of prior social-material connections between people and the land (which Marx and

other classical economists called *previous* or *primitive accumulation*) underpins not only the specific forms of class exploitation that characterize capitalism but also this system's severe antagonism between town and country and its degradation of the soil. Indeed, for Marx, capitalism's alienation of labor was dependent on (and could only be developed in accordance with) the alienation of human beings from nature (Burkett, 1999, chaps 5-6; Foster, 2000, chap 5).

In this connection, Marx (1973) insists that

it is not the *unity* of living and active humanity with the natural, inorganic conditions of their metabolic exchange with nature, and hence their appropriation of nature, which requires explanation or is the result of a historic process, but rather the *separation* between these inorganic conditions of human existence and this active existence, a separation which is completely posited only in the relation of wage labor and capital. (p. 489)

To understand capitalism, it is necessary to grasp its dual alienation of nature and labor, the extreme separation of the mass of the population from the natural, inorganic conditions of their being—a separation exhibited, according to Marx, in the antagonism of town and country. If human evolution has taken a form in which inorganic nature is appropriated through increasingly complex tools (extended organs) of human labor, it is also true that these conditions of production (inorganic nature and tools) have come under the control of a very few. In this way, the mass of the population has been deprived of any birthright connection to the earth and even to air, food, sunlight, health, and so forth, insofar as these connections contradict the profitable exploitation of wage labor in the production of privately vendible commodities (Marx, 1974, pp. 359-360).

What arises from Marx's materialist dialectic of organic/inorganic relations, then, is an understanding of the ecological rift that forms the foundation of modern capitalist society. This rift can only be eliminated through a replacement of class-exploitative production, property, and market relations with a system of cooperative-democratic worker-community control over the conditions of production—a system that, predicated on the transcendence of the alienation of nature and labor, alters the human relation to the earth in ways that encourage sustainable and proecological forms of human development. "From the standpoint of a higher socio-economic formation," Marx (1981) wrote,

The private property of particular individuals in the earth will appear just as absurd as the private property of one man in other men. Even an entire society, a nation, or all simultaneously existing societies taken together, are not owners of the earth. They are simply its possessors, its beneficiaries, and have to bequeath it in an improved state to succeeding generations as *boni patres familias* [good heads of the household]. (p. 911)⁷

THE ECOLOGICAL TRANSFORMATION OF MARX'S NATURE-DIALECTIC

The foregoing analysis has shown that Hegel's dialectic of organic/inorganic relations played a central role in the development of Marx's understanding of human-natural relations. Yet in Marx, the idealistic cast of Hegel's philosophy of nature was rejected from the start in favor of a more materialist approach, reflecting Marx's systematic encounter with materialism via Epicurus and Feuerbach.⁸ For

Marx, the alienation of nature does not entail an estrangement of the spirit from a nature that is exterior to it. Rather, it is the real historic process that creates a *social-material separation* between the inorganic conditions of human existence and the active existence of human beings, a separation that is fully realized only within bourgeois society. The philosophy of nature, which in its Hegelian form turns on the relation between organic and inorganic, was thus transformed by Marx into a question of human alienation and freedom as historical, material, and social products.

To understand how Marx's materialism affected his understanding of the dialectic of organic/inorganic relations, it is necessary to look more closely at Marx's materialism itself. Maurice Mandelbaum (1971) has usefully defined 19th-century materialism, of which Marx and Engels were among the greatest representatives, as follows:

Materialists, like idealists, seek to state what constitutes the ultimate nature of reality, and are willing to distinguish between "appearance" and that which is self-existent and underlies appearance. Taken in its broadest sense, materialism is only committed to holding that the nature of that which is self-existent is material in character, there being no entities which exist independently of matter. Thus, in this sense, we would class as materialist anyone who accepts all of the following propositions: that there is an independently existing world; that human beings, like all other objects, are material entities; that the human mind does not exist as an entity distinct from the human body; and that there is no God (nor any other non-human being) whose mode of existence is not that of material entities. (p. 22)

There can be no doubt that Marx adopted such a broad "materialist conception of nature" (as Engels, 1888/1941, p. 67, called it), and that this constituted the basis on which he erected his materialist conception of history—that is, the notion of a practical materialism in which society was understood in terms of the development of human productive forces and relations rooted in human praxis (Engels, 1888/1941; see also Bhaskar, 1983; Foster, 2000).⁹ Indeed, it was Marx's materialist conception of both nature and history that led him to develop his distinctive understanding of the dialectic of organic/inorganic relations as encompassing both physical phenomena and the historical development of human-social relations. It was this also that made Marx sensitive to developments in the natural sciences, with their increasingly materialist emphasis. Clearly, the issue was no longer one of the alienation of spirit from nature (as in the idealist philosophies of nature propounded by Schelling and Hegel) but the "really earthly question" of human material existence (Marx & Engels, 1975, Vol. 1, p. 225). Hence, in Marx's work, the dialectic of organic/inorganic relations represented by Hegel's philosophy of nature is gradually transformed into a materialist ecology concerned with the rifts in the metabolic relation between human beings and nature. For Marx, Hegel's idealism had taken the form of an attempt to restore the 17th century metaphysics of Descartes, Spinoza, and Leibniz in opposition to Enlightenment materialism, represented in ancient times by Epicurus and in more modern times by Bacon, Hobbes, Gassendi, Locke, Holbach, and Helvetius.¹⁰ The answer to Hegel, for Marx, lay in the development of a materialism that was dialectical and emphasized historical praxis. In addition to its political significance, such an approach had the virtue of a close affinity to the main (materialist) currents in natural science (Foster, 2000, pp. 62-64; Marx & Engels, 1975, Vol. 4, pp. 128-129).

The great scientific revolutions of the 19th century in cell physiology, chemistry, the discovery of the conservation of energy, evolutionary theory, and paleontology all contributed to the further dissolution of the “rigid system of an immutable, fixed organic nature” (Engels, 1940, p. 12), which had characterized medieval thought, opening the way to more dialectical conceptions. The great chemical discoveries of Liebig and others tended to blur the former distinctions between animate and inanimate nature. At the same time, it became more and more clear that to study living things independent of the material environment in which they lived led to fallacious results. Central to the scientific progress of the period was the simultaneous discovery of the conservation of energy by Julius Robert Mayer, Hermann von Helmholtz, and James Prescott Joule. In this conception, the ancient materialist principles of Democritus and Epicurus—that nothing comes from nothing, and nothing being destroyed can be reduced to nothing—were given new meaning.¹¹ By placing emphasis on the transformation of energy, the idea of the conservation of energy freed physics of imponderables associated with underlying substance. As Ernst Cassirer put it, “the permanence of relations replaced the permanence of matter” (as cited in Rosen, 1959, p. 251). Closely interconnected with the discovery of the conservation of energy was the development of the concept of metabolism in the work of Liebig, Mayer, and others. It was quickly recognized that the fundamental biological processes of metabolism involved exchanges between organisms and their environments in conformity with the principle of the conservation of energy (Rosen, 1959, pp. 253-261).¹² Out of this arose, particularly in the work of Liebig, an early ecological understanding of the relation between organisms and their environmental conditions, exemplified by his research into the soil nutrient cycle. As one of Liebig’s biographers was to write,

there is [expressed in Liebig’s thought] a beautiful connection between the organic and the inorganic kingdoms of nature. It is inorganic matter mainly which affords food to plants, and they, on the other hand, yield the means of subsistence to animals. (Shenstone, 1901, p. 84)

These scientific developments were to exert a profound influence on Marx who, in his later writings, tended to refer less frequently to the dialectic of organic/inorganic relations as such and emphasized rather the notion of the “metabolic” relations between humanity and nature. Marx’s analysis, under the influence of Liebig, of the “metabolic rift” in agriculture, resulting from the break in the soil nutrient cycle brought on by industrialized agriculture (and emanating from the whole antagonistic division between town and country under capitalism), led him to a much more directly ecological understanding of the relationship between human beings and their environment. By promoting an antagonism between town and country, capitalist production, Marx (1976) wrote,

disturbs the metabolic interaction between man and the earth, i.e. it prevents the return to the soil of its constituent elements consumed by man in the form of food and clothing; hence it hinders the operation of the eternal natural condition for the lasting fertility of the soil. Thus it destroys at the same time the physical health of the urban worker and the intellectual life of the rural worker. . . . Capitalist production, therefore, only develops the techniques and the degree of combination of the social process of production by simultaneously undermining the original sources of all wealth—the soil and the worker. (pp. 637-638)

Here, the old fixed opposition between the organic and inorganic fully gives way to an understanding of ecological processes of exchange—raising the question of sustainability. If nature remained “man’s inorganic body,” this human-natural dialectic was now, in new and more complex ways, conceived as arising out of a coevolutionary process (see Foster, 2000, pp. 141-177).

Labor became for Marx not simply the extension of human powers over inorganic nature but rather a process of the transformation of energy in which human beings were dependent on larger material and/or ecological conditions. This took his analysis even further away from purely instrumentalist perspectives in which nature’s role was merely passive (see Burkett, 1998, pp. 120-133, 1999, chaps. 2-4). Rather, the issue became one of sustainability (and coevolution): the way in which agricultural improvement, for example, was tied to the necessity of sustaining “the whole gamut of permanent conditions of life required by the chain of human generations” (Marx, 1981, p. 754). The materialist-dialectical approach to the philosophy of nature was thus gradually transformed in Marx’s later work, as a result of ongoing developments in materialism and science, into a modern ecological vision.

INSTRUMENTALISM AND TELEOLOGY: CONTRADICTIONS IN THE ECOLOGICAL CRITIQUE OF MARX

Again and again, ecological critics of Marx have employed his reference to nature as the inorganic body of humanity to suggest that Marx adopted an instrumentalist approach in which nature was no more than a mechanism to be appended to human productive needs. Related to this is the charge of dualism: that Marx saw the relation between nature and humanity as one of absolute opposition, rejecting any dialectical conception in this area. In the words of Clark (1989), “Marx’s image of the relationship between humanity and nature remains the proprietary one bequeathed to us when the God of ancient Israel gave Adam dominion over the earth” (p. 251). Hence, for Clark, Marx simply replicates the Judeo-Christian ethic of the Bible in his attitude toward nature, seeing nature as an object to be exploited. At the same time, Marx is seen not as a “prophet of resurrected nature, but rather of triumphant enlightenment,” (Clark, 1989, p. 252)—that is, as a representative of the Enlightenment humanistic view in which nature was simply subordinated to human reason. “Nature, apart from ‘man,’ is therefore necessary,” Clark writes in his interpretation of Marx, “only as an instrument in this self-creation” of humanity (p. 252). Similar arguments have been advanced, as we have seen, by such thinkers as Eckersley (1992), Salleh (1997), Routley (1981), and O’Neill (1994). Salleh (1997) argues that Marx drew on “ontological assumptions derived from the Great Chain of Being” (p. 71, 74) of medieval scholasticism, and even Aristotle, in order to develop an anthropocentric (and androcentric) account of nature as man’s dominion. Furthermore, in characterizing nature as “man’s inorganic body,” Marx purportedly treated nature as the “‘instrument’ of his needs” (Salleh, 1997, pp. 71, 74).

Such conclusions, however, simply read into Marx an instrumentalism that is assumed to be there; they are not informed by a close and comprehensive examination of Marx’s texts. Marx (1974) wrote in the *Economic and Philosophical Manuscripts* about the dialectic of organic/inorganic relations and of the alienation of human society from nature, drawing on both the Hegelian philosophy of nature and materialist philosophy extending back to Epicurus. What emerges from such an

analysis is a complex dialectical and coevolutionary view that focuses on ecological interdependencies. This analysis immediately transcends simple dualistic and instrumentalist accounts of the relationship between human beings and nature. Moreover, in Marx's case, the argument is a materialist one and hence becomes integrated with a growing body of knowledge about ecological relations in the overlapping realms of human history and natural history.

In Marx's (1974) view, the growth of bourgeois society with its commodification of nature represents "an actual contempt for and practical degradation of nature" (p. 239). This is exemplified by the fact that, as Thomas Müntzer declared, "all creatures have been made into property, the fish in the water, the birds in the air, the plants on the earth" (as cited in Marx, 1974, p. 239). For Marx, a dialectic of organic/inorganic relations and of human-nature relations was assumed from the start. Furthermore, the dialectical unity of human beings with nature required no explanation. What needed to be explained was the severing of this unity—the alienation of human beings from nature or what Marx was later to call the "rift" in the metabolism connecting human beings to nature. Marx's approach was dialectical, but it also presented the dialectic as a material problem arising from the alienated development of human society itself. Marx was thus driven by the very nature of his theoretical perspective to absorb the major ecological insights of his day—through the work of thinkers such as Liebig and Darwin.

The fact that Marx's approach to human-nature relations was dialectical does not of course completely elude critics such as Clark (1989). Thus, Clark admits that "on rare occasions" Marx's analysis moves "in the direction of . . . an ecological dialectic" (p. 250). He even refers to Marx's (1976) discussion of the degradation of the soil and the metabolic rift in the cycle of nutrients, arising from the antagonistic relation between town and country, as presented in Volume 1 of *Capital*. Yet, Clark (1989) claims that "Marx himself fails to go very far in developing these rudiments of an ecological dialectic" (p. 250). Here, Clark is hampered by the fact that his references to Marx's writings in this area are drawn entirely from a collection of excerpts provided by Howard Parsons' (1977) book, *Marx and Engels on Ecology*. Clark (1989), it would seem, has no direct knowledge of Marx's (1976) *Capital* itself. He fails to recognize, therefore, that Marx's analysis of the metabolic rift, which grew both out of his understanding of the work of Liebig and in response to the crisis of the soil in 19th-century agriculture, took the form of a complex, many-sided ecological dialectic in his later writings (particularly *Capital*), encompassing the concept of sustainability as well as the need for social-ecological transformation (Burkett, 1999, pp. 126-128; Foster, 1999, 2000, pp. 141-177).

Of greater importance in Clark's (1989) assessment, however, is his presumption that ecological thought is only dialectical to the extent that it is teleological. Clark suggests that Marx derived from his "Aristotelian and Hegelian heritage" a teleological viewpoint in which "a phenomenon . . . must be comprehended as a being in process or movement in which its *ergon*, or peculiar behavior, is related to its *telos*, or completed form of development" (pp. 249-250). Disregarding the fact that Marx, as a consistent materialist, followed Epicurus rather than Aristotle in this respect (and thus explicitly rejected all teleological analysis of nature), Clark argues that it was only to the extent that he incorporated such a "teleological dialectic" that Marx developed an "organicism dimension" (pp. 249-250) in his thought and thus bordered on the ecological—although ultimately, according to Clark, Marx abandoned teleology and organicism. In Clark's view, although Marx does exhibit "a recognition of teleology in nature" at certain points, "Marx does not

develop this teleological conception" (p. 255). Hence, his thought remains antiecologically anthropocentric.

What such criticisms demonstrate is not Marx's inadequacy as an ecological thinker but rather the criteria for ecological analysis embodied in much of contemporary philosophical ecology. In Clark's (1989) view, it is impossible to be a consistent ecological thinker from a materialist or realist standpoint, which rejects teleology; rather, ecological analysis is by definition teleological and essentialist. For Clark, it is Marx's materialist conception of nature that is the enemy of ecology. We are thus led to believe that ecology must follow a mystical, spiritual direction, exemplified by Plato, Aristotle (in his more teleological analysis), Spinoza, and Hegel. Thinkers who developed more materialist perspectives, associated more with the development of modern science, such as Epicurus, Hobbes, Marx (insofar as he broke with Hegel), and Darwin are seen as antiecological in their thinking, despite the fact that scientific ecology has always been more closely connected with the latter than the former.

One is thus struck by the strange irony presented by thinkers who criticize Marx—together with Darwin, one of the two greatest materialists of the 19th century—for supposedly taking his image of human-nature relations from "the God of ancient Israel" and for his adherence to the "great chain of being" of medieval Scholasticism. At the same time, it is claimed that Marx's primary failure was his abandonment of a teleological concept of nature. It is, of course, the latter criticism that should be taken most seriously. Marx is condemned here primarily for his materialism, which is assumed to be at variance with an ecological outlook.

This rejection of materialism accounts for much of the mysticism in contemporary Green theory, in which material relations and sustainability are no longer the issue, but rather an abstract, moral division between anthropocentric and ecocentric views is. In the words of Murray Bookchin (1990),

Mystical ecologists who dualize the natural and the social by contrasting "biocentricity" with "anthropocentricity" have increasingly diminished the importance of social theory in shaping ecological thinking. Political action and education have given way to values of personal redemption, ritualistic behavior, the denigration of human will, and the virtues of human irrationality. At a time when the human ego, if not personality itself, is threatened by homogenization and authoritarian manipulation, mystical ecology has advanced a message of self-effacement, passivity, and obedience to the "laws of nature" that are held to be supreme over the claims of human activity and praxis. (p. 47)

If the main criteria for dealing with the present world ecological crisis is one of creating a more sustainable society, which means a more sustainable relation to nature, this cannot be achieved by means of a one-sided mystical, spiritual, romantic perspective and an emphasis on undifferentiated holism, abandoning all bases for meaningful praxis—any more than it can be achieved through a reliance on mechanism. What is needed, rather, is a nondeterministic materialism and ecological humanism that recognize the dialectical linkages between humanity and nature, between human consciousness and the natural world. What cannot be accepted is a "passive" relation to nature, rooted in a perpetuation of dualistic conceptions. Unfortunately, much of philosophical ecology suggests precisely this kind of passive and dualistic standpoint.

In many ways, the flipside of Clark's (1989) argument is to be found in O'Neill's (1994) surprising contention that scientific ecology is inherently mechanistic and

reductionist, opposed to approaches that are dialectical and holistic. According to O'Neill's account, Marx's emphasis on the ultimate oneness of organic and inorganic nature contradicts science. Like many thinkers in the Hegelian Marxist tradition, O'Neill essentially cedes nature (and the whole realm of physical and natural science) to positivism. The dialectic is confined to the realm of society and social science alone. Yet, for those among Marx's critics who insist, nonetheless, on dealing dialectically with nature, this has often led, as in the case of Clark (1989), to the view that one can only be dialectical by being nonscientific, hence teleological, mystical, and so forth—a position that O'Neill (1994) himself rejects.

CONCLUSION

At issue in the standard critique of Marx's organic/inorganic distinction then are two different and strongly opposed visions of ecological philosophy: one that is materialist, historical, and essentially scientific in character; the other that derives its emphasis from mystical distinctions between anthropocentric and ecocentric and from spiritualistic allusions to nature's teleology. From the latter standpoint, it is impossible to perceive the real class-exploitative alienation of nature. Hence, the social problem underlying ecological destruction disappears, giving way, as Bookchin (1990) aptly puts it, to a philosophy of "personal redemption, ritualistic behavior," and the like. For ecology to be related to social transformation, it must adopt a material-social standpoint that emphasizes the reality, the this-sidedness of the degradation of nature—not as a mere ethical problem but as a problem of real existence and human praxis. Marx's approach provides just such a standpoint. "The conventional antinomies of nature/culture, environment/society, human/nonhuman, and subject/object," Timothy Luke (1999) has written, "all implode in Marx's rendition of these links as one active organic/inorganic project" (p. 44). In Marx's materialist dialectic of organic/inorganic relations, one finds neither a narrowly instrumentalist, anthropocentric perspective nor a flight into mysticism, but rather the core of an ecological critique of capitalist society—a critique that should allow us to translate ecology into revolutionary praxis.

NOTES

1. Marx's notion that labor is the sole source of value under capitalism (a view that he shared with the other classical economists) is sometimes taken as an indication of the anti-ecological nature of his thought—a view that Clark (1989) exploits here. Yet, the significance of Marx's argument in this respect is frequently misunderstood, because Marx also repeatedly insisted that labor is not the sole source of use value or wealth—nature being just as important (or more important) in that respect. Indeed, in Marx's view, the fact that capitalistic values disregard nature's contribution to wealth only points to the one-sided, alienated reality of capitalist society and its law of value, which needs to be transcended in postcapitalist society. For further discussion, see Burkett (1999, chaps 6-8) and Foster (2000, pp. 167-168).

2. The charge that Marx adopted a "Promethean" (mechanistic, productivist) view of nature has come under heavy criticism in recent years. See Burkett (1999, chap 11), Sheasby (1999), and Foster (2000, pp. 126-136).

3. The assertion that inscribed within Marx's thought was the medieval notion of the Great Chain of Being, traceable ultimately back to Aristotle, is a peculiar one, given that Marx was part of the materialist revolt against such teleological conceptions; so much so in fact that he had turned as early as his doctoral dissertation to Epicurus, the great enemy of Aristotelian and Christian teleology. On this, see Foster (2000, pp. 21-65). As Clement of

Alexandria had pointed out, Epicurus was the great enemy of all those who argued from the standpoint of providence (Marx & Engels, 1975, Vol. 1, p. 37).

4. In addition to the ancient materialists, notably Epicurus, Marx was also influenced in complex ways in the development of his materialist philosophy by Aristotle, despite the latter's general teleological perspective. Not only was Aristotle a dialectical thinker, but it was owing to his work that some of the earliest materialist ideas were known, and Aristotle's corpus (particularly his *Physics*, *Metaphysics* and *History of Animals*) can be seen as encompassing materialist conceptions at points—so much so that Marx himself did not hesitate to refer to Aristotle as “a materialist” in some qualified sense (Marx, 1934, p. 80; see also Farrington, 1944, pp. 114-115, 120). Nevertheless, Aristotle's strong adherence to teleological views, most glaringly apparent in his *On the Parts of Animals* (Aristotle, 1882), in which crude teleological explanations for the development of animal organs were used at every point, made his work a fountainhead for later antimaterialist views, which were to dominate medieval Christian (Scholastic) thought.

5. Lenin (1961), in his *Philosophical Notebooks*, carefully scrutinizes Hegel's treatment of the inorganic conditions of human existence—further highlighting the Hegelian roots of Marx's dialectic here (Lenin, 1961, p. 212).

6. The concept of *extension* as a property of matter or the body has long been a crucial part of the materialist conception of nature. As Hobbes (1929) wrote in his *De Corpore*, “a body is that, which having no dependence upon our thought, is coincident or coextended with some part of space” (Vol. 1, p. 102).

7. Marx's argument here—that the earth/land should never be treated as individual or even communal property—contradicts completely Routley's (1981) contention (previously discussed) that Marx viewed nature as property in the standard sense of free disposability and exploitability (as opposed to communally limited user rights). See Burkett (1999, chap. 14) for further discussion in the context of a complete ecological evaluation of Marx's vision of communism.

8. In commenting critically on the materialist tradition in philosophy, which he associated in particular with Epicurus and his modern adherents, Hegel (1830/1971) went so far as to concede that the aim of materialism was in his terms a dialectical one: “We must recognize in materialism the enthusiastic effort to transcend the dualism which postulates two different worlds as equally substantial and true, to nullify this tearing asunder of what is originally One” (p. 34).

9. Mandelbaum (1971) offers a further definition for those who he refers to as “strict materialists.” Strict materialists adhere to the notion that there are, in addition, definite laws for all material phenomena. Thinkers such as Moleschott, Vogt, and Büchner were strict materialists in this sense. Engels also might be characterized as a “strict materialist,” according to Mandelbaum, in the sense that he believed in definite physical laws governing the material universe. But Engels' laws, in contrast to those of mechanistic materialists such as Moleschott, Vogt, and Büchner, were not fixed and unchanging—and therefore mechanistic in nature—but rather dialectical and thus consistent with an emergentist naturalism (Mandelbaum, 1971, pp. 25-27).

10. Hegel (1959), as Marx was well aware, had counterpoised Epicurus to Descartes, Spinoza, and Leibniz in his *Encyclopedia of the Philosophical Sciences*, contrasting Epicurus, the materialist who gave the gods no role within the world of nature, to the 17th-century metaphysicians with their “ontological proof” of God's existence. See Hegel (1830/1971, p. 30). Locke's inclusion by Marx in the pantheon of materialists may surprise some, because it is more common nowadays to see Locke as an empiricist but not as a materialist. Marx, however, clearly associated Locke with Gassendi (the restorer of Epicurus) and the great opponent of Descartes. Gassendi rejected both Cartesian metaphysics and the mechanistic materialism of Descartes's physics. Instead, he emphasized a materialism that stressed the role of sensation. Modern scholarship has confirmed the close connection between Gassendi and Locke in this respect. See Ayers (1991, pp. 34-35, 1999, p. 4).

11. In developing the notion of the conservation of energy and connecting this to metabolic relations within physiology, Mayer adopted as his foundation the principle of conser-

vation as enunciated in ancient materialism, most clearly by Epicurus. Thus, in 1842, Mayer wrote (in terms Epicurus had made famous) that "no given matter is ever reduced to nothing and none arises out of nothing" (as cited in Rosen, 1959, p. 251).

12. The development of new knowledge concerning both the conservation of energy and metabolic processes, in a society that emphasized monetary exchange above all, was no mere accident. As George Herbert Mead (1936) pointed out, the discovery of the principle of the conservation of energy was rooted in concerns that arose out of the labor theory of value of classical economics. See Mead (1936, pp. 243-246).

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